compressing the internal carotid, probably gave rise to the bruit, and the occlusion of the vein, by preventing the free return of venous blood, probably gave rise to the pulsation of the eyeball, and its protrusion from the orbit.

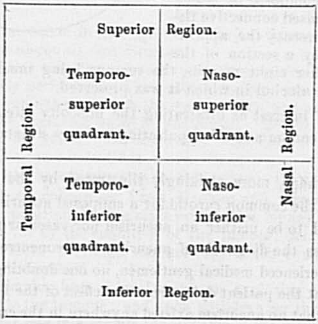
Perhaps the tendency at the present is too strongly inclined to regard *all* deep-seated pulsating tumours of the orbit as true aneurism, and I report this case chiefly to add to the statistics of this class of tumours, for I am fully convinced that, until a more thorough and extensive study of the subject shall develop more accurate diagnostic distinctions than are at present known, mistakes in diagnosticating these tumours must occasionally happen.

ART. XIII.—*On a Modified Mode of detecting Paralysis of the Ocular Muscles.* By H. CULBERTSON, M.D., Professor of Ophthalmology in the Columbus Medical College, Ohio.

IN considering this subject, one of the sources of confusion is the necessity of describing the position of the false images and of the meridians for *each eye*. This we would avoid by adopting a uniform method of investigation for *either eye*, and which is as follows:—

A diagram like that below, Fig. 1, is drawn on card-board, which should be about 21 inches square and perforated with an opening in the centre, half an inch in diameter.

Fig. 1.

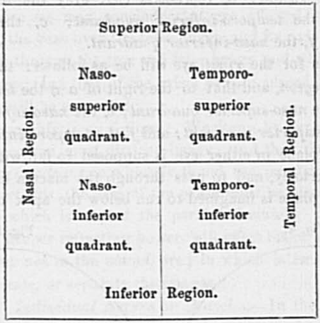


This diagram is intended to be viewed when inspecting the *left eye*.

When examining the *right eye* the lateral regions will be reversed. (See Fig. 2.)

These diagrams may be made on opposite sides of the same card-board, and the side employed which corresponds to the right or left eye when the patient is placed in front of the figure for examination.

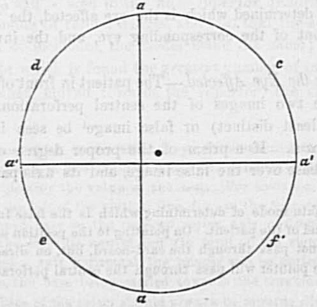
Fig. 2.



The diagram intended for the *right* or *left* eye should be placed in front of a lamp, its centre on a level with the eye, before the patient, and usually three or four feet from the party to be inspected. It may be necessary to change the antero-posterior axis of the eyeball, by inclining or turning the head, to discover the false image in paralysis of some of the muscles of the eye.

The eyeballs examined are also, in imagination, divided into the same *regions* and *quadrants*, represented on the card-board, Figs. 1 and 2; and these *regions* and *quadrants* are supposed to move with the eyeballs. Thus Fig. 3 is a front view of these divisions. The section above the

Fig. 3.



horizontal plane is the *superior region*, and that below this the *inferior region* for either eye; that to the left of the vertical plane *a a*, for the left eye, the *temporal region*, and that to the right of *a a* (for the same eye) the *nasal region; d*, represents (left eye) the *temporo-superior quadrant; e*, the *temporo-inferior quadrant; c*, the *naso-superior quadrant;* and *f*, the *naso-inferior quadrant.*

The divisions for the *right* eye will be as follows: that to the left of *a a* the *nasal region*, and that to the right of *a a* the *temporal region; d*, represents the *naso-superior quadrant; e*, the *naso inferior quadrant; c*, the *temporo-superior quadrant;* and *f*, the *temporo-inferior quadrant.*

The vertical plane in either eye is supposed to fall within the apex of the cornea anteriorly, and to pass through the macula lutea posteriorly. The horizontal plane is imagined to run below the apex of the cornea in front, and to intersect the macula lutea behind. Fig. 4 represents a lateral, and Fig. 5 a posterior, view of the horizontal plane.

Fig. 4.

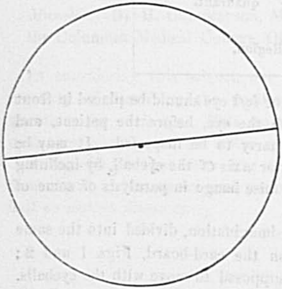
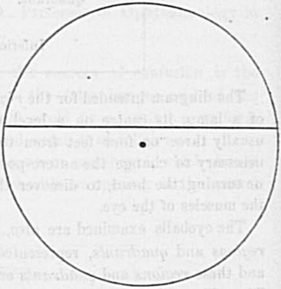


Fig. 5.



After having determined which is the eye affected, the proper diagram is placed in front of the corresponding eye, and the investigation proceeded with.

To determine the Eye Affected.—The patient in front of the card-board, Fig. 1, will see two images of the central perforation. Suppose the marginal (the least distinct) or false image[1] be seen in the *temporo-superior quadrant.* If a prism of the proper degree of refraction be placed with its base over the false image, and its axis parallel to a right line intersecting the true and false images, the two images will be united. But if the prism be carried before the opposite eye, its base and axis in the same direction as above (the several *regions* depicted in Fig. 1 being transported, in imagination, with the prism), the images will be further separated. Hence we may conclude *that* eye affected before which the prism is placed, the base over the false image and its axis parallel with a right line drawn through the true and false image, and which, thus placed, fuses these images; and that, if the prism be thus placed before the sound eye, the images will be separated.[1]

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[1] The most certain mode of determining which is the false image is to place a pointer in the hand of the patient. On pointing to the position of the false image, the pointer will not pass through the card-board, but, on directing it upon the central image, the pointer will pass through the central perforation of the card-board.

The reason for this is as follows: We know by experiment that the central is the *true* and most distinct image; and that the *false* image is in the *region* or *quadrant* in which is found the paralyzed muscle; and, further, to correct this, the base of the prism must be placed in the *region* or *quadrant* in which is located the paralyzed muscle. When so placed the glass, if of proper refracting power, will effect fusion of the images in the *diseased*, but not in the *sound*, eye; in which latter it will only prevent a normal state, or separate the images.

Paralysis of Individual Nerves or Muscles.—In the plan herein proposed it should be remembered that sometimes the *regions* and *quadrants* will be so largely displaced as to falsify this method of investigation. But, as it is evident the same difficulty would obtain by any method of detecting ocular paralysis, no greater objection can be had against this plan than to those heretofore proposed.

Paralysis of the Third Nerve.—The apex of the cornea is drawn slightly into the *temporo-inferior quadrant* by the external rectus and the superior oblique muscles. In the complete form of this paralysis, the muscles paralyzed are the levator palpebrarum, the internal, the superior, and the inferior recti; and the inferior oblique, the ciliary, and the sphincter pupillæ muscles.

The rays of light impress the retina in the *temporo-inferior quadrant.* The false image will be seen in the *naso-superior quadrant;* by virtue of the law of inversion of retinal images, and also that the angle of reflection is equal to that of incidence, the media being the same; or in the *region* of the eyeball, in which is found the greatest number of paralyzed muscles. The eye lags when moved towards the *superior*, the *inferior*, and the *nasal regions.*

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[1] In determining which is the affected eye, it is essential that the base of the prism be not reversed in the horizontal or vertical meridians. For it is evident that this would destroy the value of the test. For instance, suppose the false image is seen to the left of the vertical line, *i. e.*, in the *temporal region*, and when the prism is placed base in the *temporal region*, axis horizontal, the images are fused. But if the base be now placed (in front of the right eye) towards the *right temporal region*, axis horizontal, the images will be united. This, however, violates the rule, the base being carried towards the true image. The plan requires that the base of the prism should always be towards the *false* image.

In uniting the true and false image, the prism should be placed with its base over the false image, and its axis parallel with a line drawn through the true and false image, and the base in the *naso-superior quadrant;* or the base in the *region* of greatest paralysis.

Paralysis of the Internal Rectus.—Here the apex of the cornea is drawn into the *temporal region*, in the horizontal meridian, by the external rectus muscle. As the only muscle paralyzed is the internal rectus, there is no inclination of the vertical meridian. The rays of light enter the eye in the *nasal region*, in the horizontal meridian, and the retina is impressed in the same meridian in the *temporal region;* and hence the false image will appear in the *nasal region*, or in the same *region* in which is found the paralyzed muscle. The eye will lag when the wand is moved towards the *nasal region*, or that in which is found the paralyzed muscle.

The prism should be placed (in fusing the images) with its base in the *nasal region*, its axis corresponding with the horizontal meridian.

Paralysis of the External Rectus.—Paralysis of this muscle causes the internal rectus to turn the corneal apex into the *nasal region*, in the horizontal meridian; and the rays of light will reach the retina in the *nasal region*, in the horizontal meridian. Hence the false image will be seen in the horizontal meridian and in the *temporal region*, or in the *region* in which is found the paralyzed muscle.

As the movement of the eyeball is in the plane of the controlling muscle, the internal rectus, the false image will not be inclined. The eye will lag when moving the object towards the *temporal region*, or in the direction of the paralyzed muscle. The prism should be placed base in the *temporal region*, and axis horizontal.

Paralysis of the Superior Rectus.—Paralysis of this muscle enables the action of the inferior rectus and of the inferior oblique muscles to turn the apex of the cornea into the *inferior region*, and slightly into the *temporo-inferior quadrant*. The retina will be impressed in the *temporo-inferior quadrant*, and, therefore, the false image will be projected in the *naso-superior quadrant*, a little above the horizontal and near the vertical meridian, or towards the *region* of the eye in which is found the paralyzed muscle—*i. e.*—*superior region.* The eyeball will lag when an object is moved towards the *naso-superior quadrant*, or towards the *region* in which is found the paralyzed muscle. The prism should be placed base in the *naso-superior quadrant*, near the vertical meridian.

Paralysis of the Inferior Rectus.—Paralysis of this muscle enables the superior rectus to roll the apex of the cornea into the *naso-superior quadrant*, thus causing the rays of light to impinge on the retina in the *naso-superior quadrant.* Hence the false image will be projected in the *temporo-inferior quadrant* near the vertical meridian: or in the *region* in which is found the paralyzed muscle. The eye will lag when the object is moved towards the *temporo-inferior quadrant*, or the *region* paralyzed.

The prism should be placed, base in the *tempqro-inferior quadrant*, near the vertical meridian.

Paralysis of the Superior Oblique.—By paralysis of this muscle and the action of the inferior oblique, the apex of the cornea is turned into the *naso-superior quadrant.* Hence the rays of light will impress the retina in the *naso-superior quadrant*, and the false image will be seen in the *temporo-inferior quadrant.* But the inferior rectus inclines the vertical meridian above into the *temporo-superior quadrant*, and thus the retina would be impressed still further outwards in the *naso-superior quadrant;* hence the false image will be projected further inwards in the *temporo-inferior quadrant:* or in the *region*, in which is found the paralyzed muscle.

The eyeball will lag towards the *naso-inferior quadrant*, and the prism should be placed with the base in the *temporo-inferior quadrant.*

Paralysis of the Inferior Oblique.—By paralysis of this muscle and the action of the superior oblique, the apex of the cornea is turned into the *naso-inferior quadrant.* Hence the rays of light will impress the retina in the *naso-inferior quadrant*, and the false image will be seen in *temporo-inferior quadrant.* But the superior rectus inclines the vertical meridian above into the *naso-superior quadrant*, and thus the retina would be impressed still further inwards in the *naso-inferior quadrant;* hence the false image will be seen still further outwards in the *temporo-superior quadrant;* or in the *region* in which is found the insertion of the paralyzed muscle. The eyeball will lag towards the *naso-superior quadrant*, and the prism should be placed base in the *temporo-superior quadrant.*

Conclusions.—1st. That in paralysis of the ocular muscles, the apex of the cornea will be carried towards the *region* in which is found the controlling muscle.

2d. That in moving an object before it, the eye will lag towards the *region* in which is found the paralyzed muscle.

3d. That if the movement of rotation is strictly within the plane of the controlling muscle, no effect will be had upon the inclination of the false image.

4th. If the movement of rotation is not within the plane of the controlling muscle, the false image will be inclined.

5th. The *false* image will seem to be located in the *region* in which is found the paralyzed muscle.

6th. That in the treatment of the disease by prisms, the base of the latter should be placed in the *region* in which is located the paralyzed muscle, and its axis parallel with a line drawn through the false and true image.

7th. To induce the same effect, artificially upon the rays of light, as produced by paralysis of the ocular muscles, the apex of the prism should be placed over the muscle assumed to be paralyzed.

8th. Although in paralysis of the superior and inferior recti, the false images are seen in the *quadrants*, yet they are located so near the vertical line or plane, that practically they may be regarded as situated in that plane, and in the *superior* and *inferior regions*. Hence in general terms, it may be stated, that in paralysis of the recti, the false image will be seen in the *regions*, and in the vertical or horizontal meridians; while in paralysis of the obliqui and of the third nerve, the false image will be located in the *quadrants*.

Illustrative Cases.—CASE I. J. B., æt. 47. Primary position in front of card-board for left eye He sees the false image in the vertical meridian in the *superior region*. The prism placed in front of the left eye base in *superior region* and axis corresponding with a right line drawn through the true and false images, unites these images, but placed before the right eye in the same position as before the left, separates the images.

The wand moved a little below the horizontal meridian develops two vertical images, the false one above and to the right (his) or in the *naso-superior quadrant*. Moved into the *nasal region*, the images become plainer and a very little further apart. Moved into the *temporal region*, the images quickly unite. Moved above or below, the images are quickly fused. There is no ptosis, the pupil is active, and accommodation is normal.

Diagnosis.—Paralysis of the third nerve, the superior rectus most affected, the internal rectus next most impaired. Originally all the branches of this nerve were paralyzed, but improvement has resulted, and renders the diagnosis less distinct. Even now there is limited impairment of the inferior rectus.

Remark.—This man has hemiplegia of the right side, from which he has recovered partially.

CASE II. J. T.; adult; equivalent to paralysis of the left internal rectus. He has an ulcer upon the apex of the left cornea, which causes the left eye to turn outwards, that the inner clear portion of the cornea may transmit light. This induces diplopia.

In front of the card-board for the left eye he detects the false image in the *nasal region* and in the horizontal meridian. The light impresses the retina in the *temporal region*, and hence the false image seems to be in the *nasal region*, or in the *region* in which is found the muscle (internal rectus), the action of which is affected as though defective in its operation, but is not paralyzed.

When the wand is carried before him into the extreme *temporal region*, he sees two erect images on the same level. He sees the same in the same positions in front of him, but nearer together. When the wand is carried into the *nasal region*, the images are easily fused.

A prism of 10° placed in front of the left eye, its base in the *nasal region* and over the false image and in the horizontal meridian, unites the images; but when the prism is carried before the right eye, its base and axis in the same direction, the images are separated.

Remark.—This man's eyes were under the influence of atropia when examined.

CASE III. Miss E. H., æt. 16. On bringing finger close to her eyes in the horizontal meridian, the apex of the right cornea turns outwards, or into the *temporal region* of the card-board for the right eye. On placing the base of the prism 3° over the false image, and in front of the right eye, the base in the *nasal region*, and its axis in the horizontal meridian, the images are fused, but before the left eye they are more widely separated when the prism is placed before that eye, its base and axis unchanged in direction.

In this investigation the patient was necessarily placed within about four inches of a small card-board with only a dark central spot and a horizontal and vertical line upon it, in discovering the diplopia.

The light impressed the retina in the *temporal region*, and hence the false image will be seen in the *nasal region*, or in the region in which is found the relaxed muscle.

Diagnosis.—A case of insufficiency of the right internal rectus—muscular asthenopia.

Remarks.—Her general health is impaired and catamenia deranged. She has amenorrhœa.

CASE IV. A male adult, æt. 25. On holding the finger close to his eyes, the patient sees two images on the card-board for the left eye. The false one in the *nasal region*, horizontal meridian. The base of the prism placed over the false image in the *nasal region* in front of the *left* eye unites them, but in front of the *right* eye it separates them.

Diagnosis.—Asthenopia and myopia with insufficiency of the left internal rectus.

Treatment.—Gave 24″ — glasses for distance and near vision, with which he read No. 1 Galezowski at 12″.

Remark.—This man has a *very* prominent nose and *quite* full eye.

CASE V. H. J., æt. 29, a male. The history of the case revealed that some months previously he received a blow upon the right temple. With the card-board for the right eye in front of the right eye, he detects the false image in the *temporal region* in the horizontal meridian. A prism of 9° placed in front of the right eye, base in the *temporal region*, and axis horizontal, fuses the images; but placed in front of the left eye, base, and axis in the same direction, separates them. The eye lags when the wand is moved into the *temporal region*. Secondary deviation of left eye greater than the primary. No diplopia to the *nasal* side of the vertical meridian.

Diagnosis.—Paralysis of the right external rectus from rheumatism.

Treatment.—Prism 9°, applied as above over right eye, and gave pot. iodidi ʒj; vini colchici ℥ss; tr. guaiac. ℥iss; fl. ext. nucis vomicæ ʒss. M. Teaspoonful after meals. Result, recovered.

CASE VI. Miss E. C.——; æt. 19. Card-board for left eye. Sees false image in the *temporal region* horizontal meridian. A prism of 10° placed in front of left eye, base over false image, axis horizontal, fuses images, and in front of right eye axis and base in the same direction, separates them. Eye does not lag in any direction. At the margin of the *superior*, *inferior*, *temporal*, and *nasal regions* the false image disappears, while the true remains. At the usual distance in reading diplopia is not observed. Primary and secondary deviation are equal. Closing left eye the right remains fixed on the object. On closing the right eye the left turns into the *temporal region*, and on opening, then, the right eye, the left turns back into its usual position into the *nasal region*.

Diagnosis.—Concomitant convergent strabismus of the left eye.

Remarks.—Although this is a case of strabismus and not of paralysis, it is included as a part of this subject. It is evident that were the left external rectus divided and its insertion brought forward, normal vision would be restored, and in fact this has been several times successfully accomplished by Dr. Vieusse. See *Recueil d'Ophth.*, 1875, p. 330.

CASE VII. A. P. Mulligan, male, aged 41. Card-board for left eye. False image in *nasal region*, prism, placed base in *nasal region*, axis horizontal, in front of *left eye* fuses the images; base and axis in same direction in front right eye separates them. Images are separated when wand is carried towards the *nasal region*, and united when moved into the *temporal region.*

Diagnosis.—Paralysis of the left internal rectus from rheumatic thecitis.

Treatment.—Prism 10° placed base in *nasal region*, axis horizontal; also pot. iodidi, comp. syrup sarsap., and vini colchici.

Result, recovered.

The publication of this method has been delayed in order to gain additional cases for illustration. But as it is thought that others can add these and better test the value of this plan of diagnosis than we, it is believed best to publish now. The plan requires to be thoroughly tested by the many competent to do it in the ophthalmological profession, and if it is found truthful and useful, or erroneous and worthless, we rest satisfied with the result.

ZANESVILLE, OHIO, May, 1875.

ART. XIV.—*Treatment of Fracture of the Femur.* By FERD. BROTHER, M.D., of Bunker Hill, Ill. (With a wood-cut)

IT is simply our purpose in this article to discuss the indications to be fulfilled, and the best means of obtaining the most favourable results in fracture of the femur.

The matter of greatest importance in treatment of all fractures is, first, "that the result should be a *perfect* limb. Secondly, the greatest comfort to the patient while being treated."

With the testimony almost universal, that lack of perfection of limb is the general result in oblique fractures of the femur, is not the inference natural that none of the methods in general use are adequate to attain the much-desired result? Admitting the truth of this proposition, the question then presenting is, is the fault in the principle of treatment, or its application? I contend that it is in the latter chiefly.

What is the principle involved in the treatment of every fracture? *It is overcoming muscular contraction by continuous extension.* This and nothing more.

By a close study of those cases where lateral supports alone are used to